

What is claimed is:

1. A method for identifying a myelodysplastic syndrome-specific gene, said method comprising the steps of:
  - 5 (a) detecting gene expressions in hematopoietic stem cells prepared from a myelodysplastic syndrome patient at a bad prognosis stage and a normal individual or patient at a good prognosis stage;
  - (b) comparing the gene expression in the hematopoietic stem cells between the myelodysplastic syndrome patient at a bad 10 prognosis stage and the normal individual or patient at a good prognosis stage; and
  - (c) identifying a gene specifically overexpressed or underexpressed in the myelodysplastic syndrome patient at a bad prognosis stage.
- 15 2. The method of claim 1, wherein the hematopoietic stem cells are prepared from bone marrow aspirate.
3. The method of claim 1, wherein the hematopoietic stem cells are prepared using hematopoietic stem cell-specific cell surface marker as an index.
- 20 4. A method of diagnosis for myelodysplastic syndrome, said method comprising the steps of:
  - (a) detecting, in tissue or cells prepared from a subject, expression of a myelodysplastic syndrome-specific gene identified by the method of claim 1; and
  - 25 (b) comparing the expression detected in step (a) with that in a control tissue or control cells, wherein the subject is judged to be at a risk of myelodysplastic syndrome (1) if the expression detected in step (a) is significantly higher than the expression of the gene in the control tissue or control cells, where the gene is specifically expressed in a myelodysplastic syndrome patient, or (2) if the expression detected in step (a) is significantly lower than that in the control tissue or control cells, where the gene is specifically expressed in individuals free from myelodysplastic syndrome.
  - 35 5. The method of claim 1, wherein the myelodysplastic

syndrome-specific gene is selected form the group of *PIASy* gene, *LIM2* gene, *NDUFV1* gene and *PNMA2* gene.

6. The method of claim 4 or 5, wherein the cells prepared from the subject are hematopoietic stem cells.

5 7. The method of claim 6, wherein the hematopoietic stem cells are prepared from bone marrow aspirate.

8. The method of claim 6, wherein the hematopoietic stem cells are prepared using hematopoietic stem cell-specific cell surface marker as an index.

10 9. A drug for diagnosing myelodysplastic syndrome, said drug comprising, as an active ingredient, a molecule selected from the group consisting of:

(a) an antibody binding to a protein encoded by a myelodysplastic syndrome-specific gene identified by the 15 method of claim 1; and

(b) a polynucleotide specifically hybridizing to a transcription product of a myelodysplastic syndrome-specific gene identified by the method of claim 1.

10 10. The drug of claim 9, wherein the myelodysplastic 20 syndrome-specific gene is selected form the group of *PIASy* gene, *LIM2* gene, *NDUFV1* gene and *PNMA2* gene.

11. A method of diagnosis for myelodysplastic syndrome, said method comprising the step of:

(a) detecting, in a biological sample, a genetic polymorphism 25 or mutation that causes abnormal expression of a myelodysplastic syndrome-specific gene identified by the method of claim 1 or abnormal activity of a protein encoded by the gene;

wherein a subject from whom the biological sample was taken 30 is judged to be at a risk of myelodysplastic syndrome if the genetic polymorphism or mutation has been detected.

12. The method of claim 11, wherein the myelodysplastic syndrome-specific gene is selected form the group of *PIASy* gene, *LIM2* gene, *NDUFV1* gene and *PNMA2* gene.

35 13. A method for identifying compounds for treating or preventing myelodysplastic syndrome, said method comprising

the steps of:

(a) administering or contacting a test compound to a test animal; and

(b) detecting, in the test animal or test cells, expression of a myelodysplastic syndrome-specific gene identified by the method of claim 1;

5 wherein the test compound is judged to be a drug candidate compound for treating or preventing myelodysplastic syndrome if the test compound decreases the expression detected in step

10 (b), where the gene is specifically expressed in a myelodysplastic syndrome patient, or if the test compound increases the expression detected in step (b), where the gene is specifically expressed in individuals free from myelodysplastic syndrome.

15 14. A method for identifying compounds for treating or preventing myelodysplastic syndrome, said method comprising the steps of:

(a) administering or contacting a test compound to a test animal or test cells harboring a reporter gene operably linked to 20 the expression control region of a myelodysplastic syndrome-specific gene identified by the method of claim 1; and

(b) detecting, in the test animal or test cells, expression of the reporter gene;

25 wherein the test compound is judged to be a drug candidate compound for treating or preventing myelodysplastic syndrome (1) if the test compound decreases the expression detected in step (b), where the myelodysplastic syndrome-specific gene is specifically expressed in a myelodysplastic syndrome 30 patient, or (2) if the test compound increases the expression detected in step (b), where the gene is specifically expressed in individuals free from myelodysplastic syndrome.

15. A method for identifying compounds for treating or preventing myelodysplastic syndrome, said method comprising the steps of:

(a) contacting a test compound with a protein encoded by a

myelodysplastic syndrome-specific gene identified by the method of claim 1; and

(b) detecting activity of the protein;

wherein the test compound is judged to be a drug candidate compound for treating or preventing myelodysplastic syndrome (1) if the test compound decreases the activity detected in step (b), where the gene is specifically expressed in a myelodysplastic syndrome patient, or (2) if the test compound increases the activity detected in step (b), where the gene is specifically expressed in individuals free from myelodysplastic syndrome.

16. The method of any one of claims 13 to 15, wherein the myelodysplastic syndrome-specific gene is selected from the group of *PIASy* gene, *LIM2* gene, *NDUFV1* gene and *PNMA2* gene.

17. A drug for treating or preventing myelodysplastic syndrome, said drug comprising, as an active ingredient, a compound identified by the method of any one of claims 13 to 16.